

REMARKS

Claims 1-33, 45 and 47-51 are pending in this application. Claims 34-44 have been canceled as being drawn to a non-elected invention. Claim 46 has been canceled. Claim 45 has been amended to incorporate the limitations of former claim 46.

All pending claims have been rejected under 35 U.S.C. § 103.

Information Disclosure Statement

Several items were lined out and not initialed as considered in the Information Disclosure Statement (IDS) filed on July 14, 2004, June 23, 2005, August 22, 2005 and October 17, 2005. Also being submitted with this IDS are clean copies of the PTO 1449 forms previously submitted that were not initialed by the Examiner. Per a conversation with James E. Austin on January 20, 2006, the Examiner agreed to indicate the references listed in clean copies if these PTO 1449 forms were submitted. The Examiner is respectfully requested to indicate his consideration of these documents in the next action by initialing next to it on the PTO Form-1449.

Election/Restrictions

Applicants affirm the election of Group I, claims 1-33 and 45-51.

Specification

The specification has been objected to for improperly attempting to incorporate a copending application without a recitation that the application is commonly assigned. Applicants have amended the specification to recite that Application No. 09/996,619 is commonly assigned, thereby obviating the objection.

35 U.S.C. § 103 Rejections

The pending claims have been rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 6,797,643 to Rocha-Alvarez et al. ("Rocha-Alvarez"). Applicants address the rejections below.

Claim 1

Claim 1 relates to forming a CDO film by contacting a substrate with one or more precursors having a carbon-carbon triple bond. Importantly, the CDO film is formed under process conditions such that the film contains carbon-carbon triple bonds and their derivative bonds. Incorporation of $\text{--C}\equiv\text{C--}$ bonds may take a key role in lowering CDO residual stress. See, e.g., the discussion on in paragraphs [0038] and [0065].

Rocha-Alvarez relates to deposition of CDO films using cyclic organosilicon compounds that are blended with various aliphatic compounds. As noted by the Examiner, Rocha-Alvarez does not specifically teach a CDO precursor having a carbon-carbon triple bond. The Examiner contends that it would have been obvious to utilize the combination of an aliphatic compound as taught in Rocha-Alvarez with a carbon-carbon triple bond with an expectation of success.

As noted in Applicants' specification, incorporation of $\text{C}\equiv\text{C}$ bonds into the film may lower tensile stress commonly associated with CDO films. As indicated, claim 1 requires that the carbon-carbon triple bonds be incorporated into the film. There is no teaching or suggestion in Rocha-Alvarez that unsaturated precursors would have any advantages over the saturated precursors listed therein. Nor is incorporation of $\text{--C}\equiv\text{C--}$ bonds in the film is not taught or suggested by Rocha-Alvarez. Reaction conditions may lead to consumption of the reactive $\text{C}\equiv\text{C}$ bonds during deposition. Absent some suggestion that it is important to preserve these bonds, it would not be obvious to one of skill to incorporate carbon-carbon triple bonds into the CDO film or that they would be incorporated into the films of Rocha-Alvarez.

For at least these reasons, Applicants submit that independent claim 1, as well as dependent claims 2-33 are patentable over the cited art.

Claim 45

As indicated above, claim 45 has been amended to incorporate the limitation of former claim 46. As amended, claim 45 recites that "the Si-O-Si backbone structure possesses an average bond angle of less than approximately 145 degrees, and a stretching vibration peak position at wavenumber of less than 1100 cm^{-1} on FTIR spectrum." These features minimizes the lattice mismatch between the CDO film and the substrate and thus lower the tensile stress commonly associated with the CDO film. High tensile stress films have Si-O-Si bonds in a cage structure are associated with a large bond angle of around 150° and a peak at about 1135 cm^{-1} . Applicants provide precursor and process conditions including, for example, incorporation of unsaturated groups, that provide the deposited film with lower stress. (see, e.g., the discussion at

paragraphs [0038], [0093]-[0094])). For example, incorporation of $\text{-C}\equiv\text{C-}$ bonds can relax the lattice of the building block (Si-O-Si backbone structure) of the CDO film to reduce the residual stress of the film.

Rocha-Alvarez does not teach or suggest that the average angle of the deposited film would be less than 145 degrees, or that the backbone structure possesses a peak at a wavenumber of less than 1100 cm^{-1} . Average bond angle depends on the particular precursor used, and process conditions, for example, reaction conditions may lead to consumption of the reactive $\text{C}\equiv\text{C}$ bonds during deposition. Absent a teaching that the films of Rocha-Alvarez are deposited at conditions that lower stress, and provide average Si-O-Si bond angles of less than approximately 145 degrees, it would not be obvious to one of skill to deposit films with these properties.

For at least these reasons, Applicants submit that independent claim 45, as well as dependent claims 47-51 are patentable over the cited art.

In addition to the reasons given above for independent claims 1 and 45, various dependent claims contain independently patentable features, some of which are discussed below:

Claim 10

Claim 10 requires forming a CDO film having carbon-carbon triple bonds on a substrate by contacting the substrate with a single CDO precursor containing carbon-carbon triple bonds. As explained in Applicant's specification, the single precursor provides all the necessary oxygen, silicon, and carbon, including the carbon-carbon triple bonds (paragraph [0070]). This is not taught or suggested by the cited reference.

The CDO films of Rocha-Alvarez are formed by blending cyclic organosilicon precursors with the aliphatic precursors listed in col. 3. There is no teaching or suggestion of using a single precursor containing carbon-carbon triple bonds to form a film containing carbon-carbon triple bonds.

Claim 14

Claim 14 recites specific precursors having carbon-carbon triple bonds. In rejecting this claim, the Examiner contends that because Rocha-Alvarez discloses a variety of organosilicon compounds and that many compounds are interchangeable, it would have been obvious to utilize the claimed compounds with the expectation of obtaining similar results. Applicants respectfully disagree. As described above, the claimed precursors are not interchangeable with the

organosilicon compounds disclosed in Rocha-Alvarez in col. 3, lines 15-55. Rather, the claimed compounds result in an incorporation of carbon-carbon triple bonds in the film, thereby resulting in lower tensile stress. Nothing in Rocha-Alvarez teaches or suggests any of these particular compounds.

For at least these reasons, Applicants submit that the pending claims are patentable over the cited art, and request that the § 103 rejections be withdrawn.

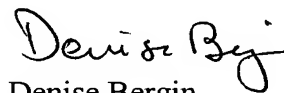
Double Patenting

Claims 1-33 and 45-51 have been provisionally rejected on the ground of nonstatutory obviousness-type double patenting over claims 1-27 of copending application No. 10/800,409 and over claims 1-31 of copending application No. 10/820,525. Applicants propose to file terminal disclaimers when and if any of these claims are otherwise indicated allowable.

Conclusion

Applicants believe that all pending claims are allowable and respectfully request a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below. If it is determined that any additional fees are due, the Commissioner is hereby authorized to charge such fees to Deposit Account 500388 (Order No. NOVLP094).

Respectfully submitted,
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